Paper #17: Superior Extension of Upper Instrumented Level in Distraction Based Surgery: A Surrogate for Clinically Significant PJK

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Introduction: Proximal Junctional Kyphosis (PJK) is a reported complication of distraction-based treatment for Early Onset Scoliosis (EOS). PJK can be detected radiographically; however, the clinical implications of PJK have not previously been studied for this population. A potential clinically significant consequence of PJK is revision surgery with superior extension of the upper instrument level (UIL). The purpose of this study was to determine the rate of clinically significant PJK during rib-based distraction surgery. A secondary goal was to define the proximal junctional angle (PJA) at the time of revision surgery, with the hypothesis that PJA will be increased in this group of patients.

Methods: This is a retrospective review of a multi-center registry for children with EOS. All children treated with rib-based distraction surgery, with minimum 2 yr follow up, were evaluated in order to identify the rate of clinically significant PJK (i.e. children who required a revision surgery that involved superior extension of the UIL). Two definitions of PJA were used (PJA-A: angle between the caudal endplate of the Upper Instrumented Vertebrae (UIV) to the cephalad endplate 2 vertebrae above UIV. PJA-B: 2 levels below UIV to 2 levels above UIV).

Results: 397 children were identified. At time of implantation, these children had mean age of 5.5 yrs, mean scoliosis of 69.9o, and mean kyphosis of 49.8o. Forty of these children required a revision surgery that involved superior extension of the UIL (10.1% rate of clinically significant PJK). Despite being younger (4.9 vs 5.5 yrs, p<0.05), the revision group had similar pre-implantation characteristics as the entire study population with mean scoliosis of 70.0o and mean kyphosis of 50.0o. Average time to revision was 2.3 yrs with mean scoliosis of 66.7o and mean kyphosis of 54.7o at time of revision . PJA-A was 5.6o pre-op vs 11.8o at time of revision (p<0.05). PJA-B was 13.1o pre-op vs 21.4o at time of revision (p=0.07).

Conclusions: A 10% rate of clinically significant PJK was found within this group of children who were treated with rib-based distraction surgery. At the time of revision surgery, PJA-A had increased significantly from pre-operative values.